

REMARKS

[0001] Claims 1-20 are pending. The Office Action mailed October 17, 2006 (hereinafter "Office Action") objected to Figure 1. The Office Action rejected Claims 1, 2, 9, 11, 12, 17, 19, and 20 under 35 U.S.C. § 103(a) as being unpatentable over the Applicant's admitted prior art in view of Nishio, U.S. Patent No. 7,068,818 (hereinafter "Nishio"). The Office Action allowed claims 10 and 18. The Office Action objected to claims 3-8 and 13-16 as depending from a rejected claim, but stated that the claims would be allowable if rewritten to include the limitations of any intervening claims.

AMENDMENTS TO THE SPECIFICATION

[0002] The specification has been amended to correct an obvious typographical error. The amendment finds full support in the specification, claims, and drawings.

AMENDMENTS TO THE DRAWINGS

[0003] Figure 1 has been amended as directed by the Examiner to add "Prior Art." The amended drawing finds full support in the specification, claims, and other drawings.

AMENDMENTS TO THE CLAIMS

[0004] The claims have been amended to more particularly point out the features of the present invention. The amendments are fully supported by the specification, drawings, and claims.

REJECTION OF CLAIMS 1, 2, 9, 11, 12, 17, 19, AND 20 UNDER 35 U.S.C. §103(a)

[0005] The Office Action rejected Claims 1, 2, 9, 11, 12, 17, 19, and 20 under 35 U.S.C. § 103(a) as being unpatentable over the "Applicant's admitted prior art" in view of Nishio. Office Action at p. 2. The Applicant respectfully traverses this rejection. The Examiner bears the initial burden of establishing a *prima facie* case of obviousness. MPEP at § 2142. The prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP at § 2142. In addition, even if all the claim limitations are taught or suggested by the prior

art references, there must be some suggestion or motivation to combine reference teachings to establish obviousness. MPEP §2142. Obviousness may be rebutted by showing that “the art, in any material respect, teaches away from the claimed invention.” MPEP at § 2144.05.III. “A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. The degree of teaching away will of course depend on the particular facts; in general, a reference will teach away if it suggests that the line of development flowing from the reference’s disclosure is unlikely to be productive of the result sought by the applicant.” *United States v. Adams*, 383 U.S. 39, 52, 148 USPQ 479, 484 (1966). The Applicant respectfully asserts that the Applicant’s admitted prior art and Nishio combined fail to teach or disclose each element of the claimed invention as required under 35 U.S.C. § 103(a). The Applicant asserts that there is no motivation, suggestion, or teaching in either the Applicant’s admitted prior art or Nishio to combine the references. The Applicant also asserts that Nishio teaches away from the Applicant’s claimed invention.

[0006] Initially, it may be useful to review the invention described in the Application and the disclosures of the prior art. In general, the Application describes automatically adjusting the quality of scanned images. Application of Ravinder Prakash, filed July 29, 2003, application no. 10/629,251 (hereinafter “Application”) at ¶ 1. Typically, conventional scanning systems use an array of optical sensors to generate a scanned image matrix where each picture element, or “pixel,” comprises an entry in the matrix. *Id.* at ¶ 6, Fig. 1. The scanned image matrix is then processed to convert raw electrical data in the scanned image matrix to a processed image matrix by comparing each entry in the scanned image matrix to a table assigned to each pixel. *Id.* at ¶ 7, Fig. 1. Each table is adjusted during a calibration process to compensate for variations between sensors. *Id.*

[0007] Dust and debris, optical or electrical defocus, malfunctioning sensors, etc. can result in low quality images over time and control points in the scanner generally cannot automatically adjust for image degradation. *Id.* at ¶ 8. The present invention provides a system, method, and apparatus for automatically adjusting scanned image quality. *Id.* at ¶ 12. A

measurement module produces a scanned image matrix and a conversion module produces a processed image matrix using a table assigned to each pixel. *Id.* at ¶¶ 14-33, Figs. 2, 3. A measurement module determines quality of the processed image matrix and generates a quality parameter based on the quality of the processed image matrix and stores a quality history of the quality parameter for previously processed image matrices. *Id.* at ¶ 37. A quality adjustment module tracks the quality history and adjusts the processed image matrix if the quality history shows a decrease in quality. *Id.* at ¶ 38.

[0008] In one embodiment, the measurement module includes an average brightness module. *Id.* at ¶¶ 13, 14, 16, 36, 46, 47. In one embodiment, the quality parameter is an average brightness variable and the average brightness module calculates the average brightness variable and then uses the average brightness to change an average brightness history variable. *Id.* at ¶¶ 14, 16, 35, 36, 46, 47. The quality adjustment module then adjusts the quality of the processed image matrix if the average brightness history variable is decreased by the average brightness module. *Id.* at ¶ 15. In one embodiment, the quality adjustment module adjusts the quality of processed image matrices using a table adjustment module that adjusts the brightness of scanned images by adjusting elements of a table assigned to each pixel. *Id.* at ¶¶ 15-17, 38, 55.

[0009] In one embodiment, the average brightness module decreases the average brightness history variable by a small amount if the average brightness variable is less than a present value of the average brightness history variable and increases the average brightness history variable by a large amount if the average brightness variable is more than a present value of the average brightness history variable. *Id.* at ¶ 49. In another embodiment, the average brightness adjustment module determines an amount to adjust brightness of the processed image matrix if a value of an average brightness history variable crosses an average brightness threshold. *Id.* at ¶¶ 15, 38.

[0010] In another embodiment, the measurement module includes a maximum brightness module. *Id.* at ¶¶ 13, 14, 17, 36, 51, 52. In one embodiment, the quality parameter is a maximum brightness variable and the maximum brightness module calculates the maximum brightness variable and then uses the maximum brightness to change a maximum brightness

history variable. *Id.* at ¶¶ 14, 76, 36, 51, 52. The quality adjustment module then adjusts the quality of the processed image matrix if the maximum brightness history variable is decreased by the maximum brightness module. *Id.* at ¶ 15.

[0011] In one embodiment, the maximum brightness module decreases the maximum brightness history variable by a small amount if the maximum brightness variable is less than a present value of the maximum brightness history variable and maximum the maximum brightness history variable by a large amount if the maximum brightness variable is more than a present value of the maximum brightness history variable. *Id.* at ¶ 51. In another embodiment, the maximum brightness adjustment module determines an amount to adjust brightness of the processed image matrix if a value of the maximum brightness history variable crosses a maximum brightness threshold. *Id.* at ¶¶ 15, 17, 38.

[0012] By contrast, Nishio teaches that quality of a captured image can be adjusted by a camera or similar device, by a computer processing the captured image, or by a print driver printing the captured image. Nishio at col. 1, ll. 20-62. Nishio teaches collecting image processing control information GC along with image data GD together in an image file GF at the time of image capture. *Id.* at col. 12, ll. 17-24. In one embodiment, the image file GF with the control information GC is received by a computer and image quality adjustment is carried out by the computer or a print driver. *Id.* at col. 14, l. 6 to col. 19, l. 54.

[0013] “The image processing control information GC is related to the image quality when the image data is generated (when filming occurs) by an image data generation device such as the digital still camera 12, and parameters relating to the exposure time, the ISO sensitivity, the aperture, the shutter speed and the focus distance which may be arbitrarily set by the user or automatically when filming, or image processing control parameters such as the exposure correction value, the white balance, the filming mode, and the target color space which may be arbitrarily set by the user may also be included.” *Id.* at col. 13, ll. 57-67 (emphasis added). “In the automatic image quality adjustment processing by the image processing application in the present embodiment, a standard parameter is predetermined as the target of the correction

(adjustment), and the image data are corrected such that the enhancement parameter values for the image data approach or match the standard parameter values.” *Id.* at col. 17, ll. 51-56.

[0014] In another embodiment, automatic image quality processing takes place in the image capture device. *Id.* at col. 19, l. 56 to col. 22, l. 12. The image capture device “acquires set image quality adjustment conditions” which include “conditions (values) directly specifying parametric values relating to image quality such as contrast, color saturation and sharpness.” *Id.* at col. 20, ll. 47-55. Image quality adjustment processing is carried out by adjusting the image data values for tone using “the so-called tone curve” and “using a prescribed formula for the color saturation and sharpness.” *Id.* at col. 20, ll. 59-67 (emphasis added). “The automatic image quality adjustment processing is correction processing for eliminating or decreasing the difference between the standard image quality and the image quality of the image data which are the object of the image processing; for example, correction is carried out such that the image quality parametric values such as contrast and the like approach the standard values. In other words, the automatic image quality adjustment processing is standardization processing for causing the image quality of image data to approach the standard image quality.” *Id.* at col. 21, ll. 54-63 (emphasis added).

[0015] Nishio only teaches capturing control information GC of the acquired image and using standard values to make automatic image quality processing adjustments. Nishio does not teach generating, tracking, storing, etc. any kind of quality history. *See generally id.*

[0016] The Office Action states that Nishio discloses “determining the quality of the processed image matrix and storing a quality history” and cites Figure 13, steps S710, S720, S730, and S740, as well as column 20, line 45 to column 21, line 24 in Nishio as evidence. Office Action at p. 3. The Office Action also states that Nishio discloses “adjusting the quality of the processed image matrix if the quality history shows a decrease in quality.” *Id.* The Applicants disagree. Nishio does not track any quality history, but instead teaches recording control information GC along with image data GD in an image file GF where the control information GC are only based on the captured image and not on any quality history. Nishio at col. 17, ll. 51-56. Nishio teaches automatic image quality processing in an image capture device

by adjusting data for standard tone curves and prescribed formulas for color saturation and sharpness. *Id.* at col. 20, ll. 59-67. No where does Nishio describe any kind of quality history.

[0017] While the Applicants assert that Nishio does not teach anything similar to a quality history, in order to move along prosecution the Applicants have amended the independent claims to clarify that the invention tracks a quality parameter in response to determining a quality of the processed image and the invention tracks a quality history of previously processed image matrices. The Applicants respectfully assert that the amended independent claims are patentable over Nishio and the Background of the Invention section Application and that Claims 1, 11, and 20 are in condition for allowance because the Background of the Invention and Nishio do not disclose all of the limitations of amended Claims 1, 11, and 20.

[0018] In addition, Background of the Invention and Nishio do not provide any motivation to combine the references. The Background of the Invention of the Application does not teach, disclose, or suggest any of the missing elements of Claims 1, 11, and 20. *See* Application at ¶¶ 1-11. Nishio teaches image quality adjustment solely on control information captured at the time of “filming” and does not teach, disclose, or suggest producing a processed image matrix by modifying each value in a scanned image matrix using a table of values assigned to each element of the scanned image matrix. Nishio at col. 12, ll. 17-24, col. 20, ll. 45-58; *see generally id.* Also, Nishio teaches away from a quality history by teaching quality adjustment solely on control information captured at the time of filming. *Id.* The Applicants respectfully assert that the Office Action fails to make out a *prima facie* case of obviousness against Claims 1, 11, and 20, original or amended.

[0019] Note that Claims 18 and 19 have been substantially amended and fit within the scope of and are more narrow than independent Claims 1, 11, and 20 and the Applicants respectfully assert that amended Claims 18 and 19 are in condition for allowance. Claims 2, 9, 12, and 17, as well as Claims 3-8, 10, and 13-16, depend on Claims 1, and 11. Because the invention of Claims 1 and 11 are not obvious in relation to the Background of the Invention in the Application prior art and Nishio, the Applicant respectfully asserts that Claims 2, 9, 12, and 17, as well as Claims 3-8, 10, and 13-16, are similarly in condition for allowance because they

depend from allowable claims. *See in re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

[0020] Should additional information be required, the Examiner is respectfully asked to notify the Applicant of such need. If any impediments to the prompt allowance of the claims can be resolved by a telephone conversation, the Examiner is respectfully requested to contact the undersigned.

Respectfully submitted,

/Brian C. Kunzler/

Brian C. Kunzler
Reg. No. 38,527
Attorney for Applicant

Date: February 20, 2007
8 East Broadway, Suite 600
Salt Lake City, UT 84111
Telephone (801) 994-4646
Fax (801) 531-1929